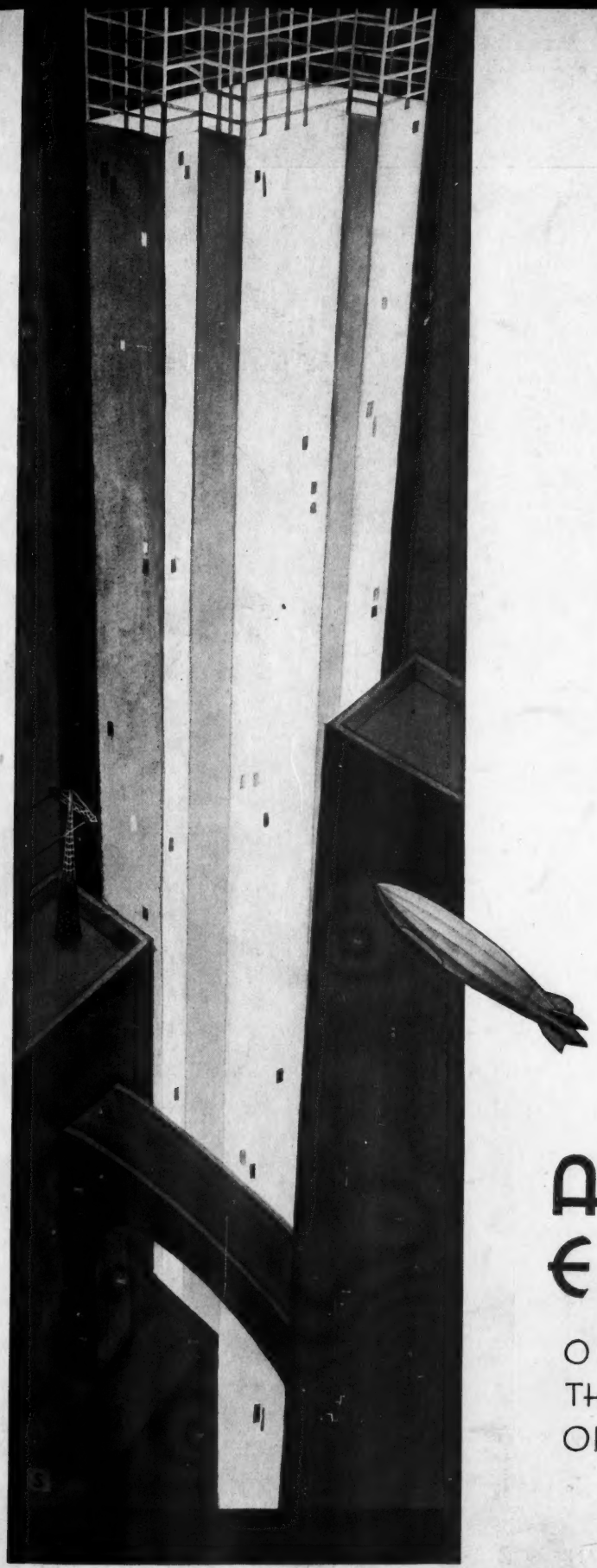
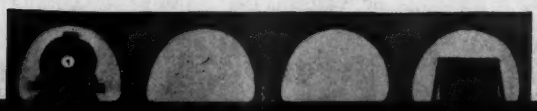


The AMERICAN ENGINEER

OFFICIAL PUBLICATION
THE NEW YORK STATE SOCIETY
OF PROFESSIONAL ENGINEERS

AUGUST ++ 1931



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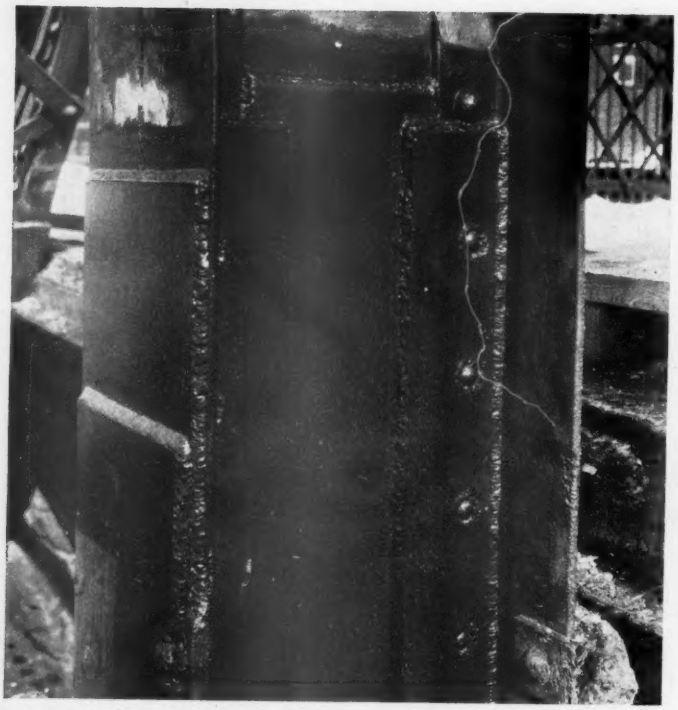

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Arthur V. Sheridan, Editor

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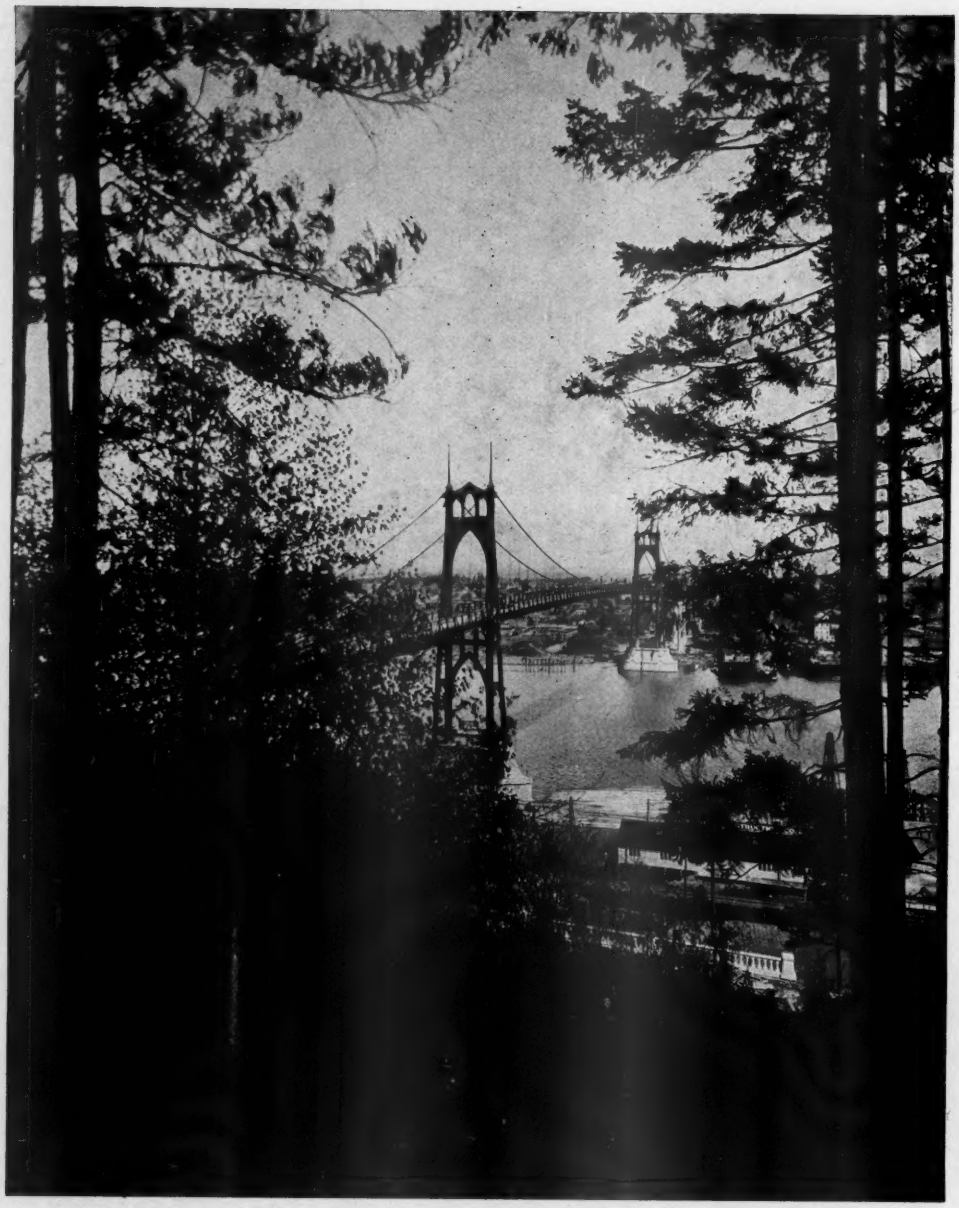

WHERE NATURE AND MAN'S CREATION HARMONIZE
St. John's Bridge, Portland, Oregon

THE AMERICAN ENGINEER

Published Monthly for
THE NEW YORK STATE SOCIETY
OF PROFESSIONAL ENGINEERS

ROOM 2952, GRAND CENTRAL TERMINAL BUILDING

NUMBER 8 NEW YORK CITY AUGUST, 1931

THE AMERICAN ENGINEER

An Appeal for Its Support

Eight months have elapsed since THE AMERICAN ENGINEER came into being. To those who have edited it, published it or in any other manner contributed to its monthly issues, it has been something of a child,—alike a source of concern and of satisfaction. Whether it has met with general approval and whether it has fulfilled its purpose are matters which warrant consideration and an expression of opinion from the profession of this State.

If one were to judge from comments and correspondence the publication has received strong commendation. However, after all, only a small percentage has expressed an opinion. The vast majority has said nothing and any expression from the publication itself might well be considered as presumption.

The advent of fall, and the prospect of winter and a legislative campaign make imperative the publication of the Society's activities and the wide distribution of an authoritative medium for disseminating information of vital importance to every engineer, not alone in New York but throughout the country where eyes are continually focused upon the Empire State.

The circumstances under which the magazine is published make necessary at this time an appeal for support from the profession at large. The publisher receives practically nothing from the Society. The membership pays little directly for the publication. The publisher and the Society have a common interest in its success, the publisher as a means of income and the Society as a medium of expression and direct contact with its membership. The sole source of revenue is the advertising matter carried by the magazine. Without it the publication could not be continued. There is no need to dwell upon the business depression which is at present being felt by all publications. In the face of conditions this one has done well. However, it cannot continue to develop and serve its purpose unless the income derived is sufficient to enable the publisher to carry on, to expand and to increase the circulation. To accomplish these objectives it is urgently necessary that the advertising matter be augmented.

There is a distinct understanding between publisher and Society that members shall not be called upon to solicit advertising. However, the publisher must look to the Society for guidance and for suggestions and almost every member can lend assistance by bringing together the publisher and those of his acquaintance who can avail themselves of the magazine as a medium for advertising.

The lack of Chapter co-operation support is somewhat discouraging. Communications from the Chairman of the Publicity Committee, from the Chairman of Chapter Activities and from the publisher frequently do not even receive the courtesy of a reply. Such indifference adds to the troubles of those who are giving freely of their time and their services.

The success of any undertaking premises mutual consideration from and by all participants. In this regard the engineer is reminded that it is but fair to avail himself, whenever the opportunity affords, of the services and products of those whose advertising serves to finance the magazine. In providing an opportunity for such contacts the publication is fulfilling a contractual obligation and appropriate recognition of such services is helpful to the success of the magazine as a contact medium.

THE AMERICAN ENGINEER belongs to the profession and must look to the profession for its support and development. To date a comparatively few persons have carried the entire burden. It is appropriate to here especially acknowledge the co-operation and contributions of President Steinman, Chairman Van Wagner of the Publicity Committee, Admiral Harris and Raphael J. Smyth of the Board of Directors and Jan C. Vieweg, the publisher.

So much for the past. The future must appeal to and provide for itself. Will the profession respond?

EDITOR.

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WHAT THE STATE SOCIETY STANDS FOR

Objectives and Activities of the New York State Society of Professional Engineers

By D. B. STEINMAN, President

1. Professional Solidarity

We are fighting unremittingly against outside forces seeking to disrupt our Profession. We are educating Engineers throughout the land to realize that the entire Profession must fight as a unit when any part of the Profession is attacked. We are educating Legislators to understand that Engineering is fundamentally a single Profession and that we are irrevocably opposed to any legislation tending to break up our Profession into discriminated branches and specialties. We have effectively stopped proposals that would have led to the disintegration of our Profession and to consequent jurisdictional disputes. We have rallied all Engineering groups into united effort for the common cause, and we are maintaining a united front for the Engineers of this State.

2. High Qualifications

We are exerting our best efforts to raise the qualification standards of our Profession. We are working consistently to raise the barriers against those of inferior qualifications and to restrict the right of practice to those who fully merit this privilege of public confidence. We have succeeded in raising the qualification requirements in this State by legislation, and the standards we created have become a model for other States to follow.

3. Educational Standards

In order that Engineering shall maintain its rightful place among the learned professions, we are insisting on corresponding educational qualifications as a prerequisite for licensing. We are defending Engineering against those who would classify it as a mere trade or vocation based on apprenticeship. Following our initiative, the State License Board has set up standards requiring evidence of preliminary and professional education commensurate with the modern requirements of the competent practice of Engineering. Through a persistent legislative campaign, we have succeeded in getting educational qualification requirements written into the law of this State. The educational qualification standards we developed have now been incorporated in the model Uniform Registration Law for other States. We are cooperating with the recognized Engineering colleges in their efforts to maintain high standards against the competition of schools giving inferior or abbreviated training. We are protecting the qualified Engineer in his investment of educational and professional training against the economic competition of the untrained or the half-trained. In doing these things, we are protecting the good name of Engineering as a learned Profession.

4. Protection of Title

We have successfully and effectively launched a campaign to stop the misuse and abuse of the designation "Engineer." Others had been talking about this evil for years, but we were the first to do anything about it. It is a fight against the self-styled and pseudo-engineer. Our campaign has won nation-wide attention. Through correspondence, persuasion, and legal reference, we have succeeded in getting many individuals, companies, and corporations to discontinue using the term "Engineers" or "Engineering" where such designation was legally unauthorized. Such travesties on our Professional designation as "Plumbing Engineers," "Amusement Engineers," "Decorating Engineers," "Fumigation Engineers," "Fence Engineers," "Radio Service Engineers," and the like were effectively stopped. The unauthorized use of the term "Engineer" by contractors, architects, salesmen, and other non-engineers was also protested and corrected. We succeeded in getting the cooperation of the Attorney General, the State Education Department, and a number of large corporations in this campaign. We have aroused Engineers to realize that the misappropriation of our designation tends to create confusion and derogatory misconception in the public mind as to the true nature and standing of our Profession. Through our persistent efforts, gratifying progress in the abatement of this abuse has now been recorded.

5. Eliminating the Unqualified

We are seeking to eliminate the incompetent and the unworthy by raising the qualification requirements for admission to practice and by supporting the State License Board in the exercise of its powers to revoke licenses on evidence of malpractice. We have committees organized to handle charges of unprofessional and incompetent practice and to transmit such charges to the State License Board for legal action. We are stopping non-engi-

neers from posing as Engineers. We are planning legislation to strengthen our licensing law in these respects and to make its enforcement features still more effective. We are exerting our efforts to bar the quack, the incompetent, and the imposter, so that the true Engineer will stand out more clearly to command public confidence and recognition.

6. High Ethical Standards

Our Society stands for the highest ethical standards to govern the professional conduct of Engineers. We are organized to receive charges against offenders, to weigh the evidence, and to take appropriate action when our ethical standards are violated. We are working to eliminate fee-cutting, commissions, misrepresentation, derogation, free plans, free estimates, and other forms of unprofessional competition. Through these efforts, we are seeking to improve working relations and mutual respect between Engineer and Engineer, as well as between the Engineer and the public he serves. We are striving to make Engineering a more satisfying Profession for those who dedicate themselves to this calling.

7. Resisting Encroachment

We are fighting a battle, for all Engineers, to resist encroachment by other callings upon our own field of Professional activity. When architects attempt to usurp the field of structural engineering, when physicians undertake to preempt the field of sanitary engineering, and when accountants legislate to monopolize the field of appraisals and valuations, our Society becomes the voice and arm of the Profession in challenging the encroachment. Through our committee at Albany, we watch all legislation that may in any way affect our Profession, and we exert our organized effort to stop or to correct any adverse legislative measure.

8. Fighting Discrimination

Our Society has vigorously taken the leadership in the battle to protect Engineers against discrimination. We are fighting to correct the discrimination in the Multiple Dwellings Law which unjustly deprives Engineers of established rights to file plans for certain buildings and alterations in New York City. We have secured an official correction of a distorted ruling which advised building departments throughout the State not to accept from Engineers plans for any structures costing more than $10,000. We are protesting misinterpretation of existing law on the part of municipal officials in various cities who are refusing to accept structural plans from Engineers. We are fighting against selfish outside obstruction and misrepresentation in our efforts to amend and clarify the existing laws so as to remove the present ambiguities and discriminations. We are fighting the organized selfishness of another profession that is seeking to eliminate or subordinate the Engineer in the field of structural design. We are arousing the Engineering Profession to realize the significance of this campaign. We are educating our legislators to understand the unfair discrimination that has been perpetrated against the Engineer. We are not seeking to restrict the rights of practice of any other profession, but we are in a fight to the finish to maintain the rights of practice of our Profession against restriction or discrimination.

9. Public Recognition

Through all these activities, our paramount objective is to improve the status of the Engineer in public understanding, recognition and esteem. Through public meetings, addresses, publications, and newspaper publicity, we are acquainting the public with the problems, the purposes, and the accomplishments of the Engineering Profession. Through the activities of our Chapters in civic problems and improvements, we are advertising the public-mindedness of the Engineer and his capacity for leadership in public service. Through our activities to bar the unqualified and to eliminate the incompetent and the unworthy, we are strengthening public confidence. Through raising qualification requirements and emphasizing high educational prerequisites, we are gaining respect for Engineering as a learned profession. Through our campaign to stop the misappropriation and abuse of our professional title by self-styled pseudo-engineers of heterogeneous designations and through our program to restrict the designation Engineer to those professionally qualified, we are clarifying the public conception of what an Engineer is and what he does. Through our fight against encroachment and discrimination, we are gaining public understanding and respect. We are encouraging the Engineer to take his place of leadership in civic, political, and legislative service, and we are educating the public to seek the Engineer for the highest administrative and executive offices and councils. We are advertising the Engineer as the trained planner and executive, equipped beyond any others to plan, direct, coordinate and successfully accomplish the largest and most difficult undertakings for the advancement of human welfare.

Through all of these directed efforts and unified activities, our one dominant objective is to secure for the Engineering Profession its rightful place in public recognition and esteem. By advancing the public standing of the Profession, we are pursuing the most effective program to secure for the individual Engineer more adequate opportunities, recognition and recompense for his high services to society.

THE PHILOSOPHER–ENGINEER

Civilization's Hope for the Future

THE NEMESIS OF AMERICAN BUSINESS

By Stuart Chase

The Nemesis of American Business is the title of a comparatively new work written by Stuart Chase and published by the MacMillan Company. It is a novel and most interesting dissertation upon the pertinent subject of What Is Wrong With America. To the engineer it offers an appeal so strong that one is reluctant to close its pages.

The following chapter is typical of the book as a whole:

Prometheus Enchained

I once wrote a book and ended it with these lines: "Prosperity in any deeper sense awaits the liberation of the engineer. If the owners will not get off his back I, for one, would not be sorry to see him combine with the wayfaring man to lift them off. A complicated technical structure should be run by engineers, not hucksters. But the technician is the modern Prometheus in chains."

I have been asked to be more explicit. It is good to end a book with a round, ringing climax, but not quite so good to be forced to explain all its implications. I recognize, however, my responsibility in the premises. I said flatly enough that I preferred engineers to business men as directors of our economic destinies, and it is clearly my duty to state the reasons.

Since James Watt tinkered with Newcomen's engine, the technician has been increasingly interfering with our food supply, and indeed with the whole economic structure. He has completely undermined the self-supporting village and the economically independent local community, over all of Western civilization, and is in the process of devitalizing it throughout the rest of the world. A few months ago in Mexico I saw fresh cuts and fills of motor roads scarring the mountain sides, and cement foundations laid for high-power transmission lines. I wondered if the end of the balanced Aztec economy was near. There has been a great deal of loose talk about "progress," "prosperity," "the torch of science;" But the uprooting of the age-old relation between the wayfaring man and his environment is a serious business; far more serious indeed than the Prosperity Chorus ever stopped to realize in its mad dash toward the bigger and better.

Before Watt, the majority of men and women everywhere were capable of providing their own food, shelter, clothing and entertainment. They grew up in the tradition of wresting their necessities from the soil, the waters, the forests about them. They may have done it with deplorable inefficiency, but they did it. Shipwreck a group of them on an uninhabited but fertile island, and they knew how to carry on.

Year by year, since 1765, the mass of mankind has been losing the ability to carry on. Shipwreck an assorted crew of bookkeepers, truck drivers, machinists and advertising men on an uninhabited but fertile island, and I would not give them two months' survival. The advertising section would hold some splendid conferences and inscribe some spirited programs, but few would know how to do anything useful. Unless by some happy chance one of the bookkeepers was a truck gardener on the side. Today the millions live in total and sublime ignorance of the forces which feed, shelter and clothe them. For all they know, switches produce light, and chain stores food. The functioning of the economic process rests in the heads of a few thousand highly trained experts. Is it too much to say that if a hundred key technicians left their posts they could seriously cripple, if not positively terminate, the functioning of a great city like New York? To make matters potentially even more precarious, each expert is so highly specialized that he has little conception of the work of the others. There is no General Staff, understanding the whole process, and correlating the vital nerves of transportation, communication, power, water, food supply, which furnish the economic substratum of the modern community.

Specialization makes for economies, sometimes prodigious economies, as the Progress Boys are tireless in pointing out. But it also makes for a highly complicated nervous system, a certain technological tenuousness, which carries a threat greater than anything we have known before—indeed, a whole series of threats, including:

Technological unemployment.

Mechanized warfare—particularly the three-dimensional attack of the bombing airplane.

Social standardization.

Over-rapid exhaustion of natural resources.

The creation of a factory robot class.

Secondhand rather than participating recreation forms.

The compulsion of speed, with consequent deleterious effects on the human nervous system.

I am enough of a Progress Boy myself to admit, somewhat grudgingly to be sure, that I am glad James Watt did his tinkering. (If he had not,

another bright young man would have invented a practical steam engine, and that within a decade. The times demanded it, and it would have come.) By and large, we stand to gain more than we lose by the emergence of the technical arts and the economic specialization which they have created. But this should not blind us to the chances taken and the risks involved. Some six million unemployed last winter must have frequently wished to be back in the handicraft age when unemployment was virtually unknown. A million and a half of them actually returned to the farms in 1930, but the agricultural community, alas, is no longer self-supporting. All is far from the best in a moderately uncertain world—with just a chance that another first-class war or another decade of uncorrelated specialization might wipe out the whole credit side of the ledger, and make us all wish to be back in a self-sufficient local economy.

In brief, engineers have been raising considerable mischief, along with their not altogether heavenly technical improvements in economic life. And the point I wish to stress is this: they have been doing the horse work while letting somebody else—chiefly the business man—take the responsibility. It seems to me that the responsibility should be squarely theirs. By the same token, the credit—if credit there be—should belong to them. Mr. Engineer, you have played the shrinking violet long enough. You have remade Western civilization, and created at the same time certain malignant evils—actual, like technological unemployment; potential, like a smash-up due to overspecialization. You should shoulder the burden of mitigating these evils; which means directing the destinies of the new society that you have built. You are responsible for it; you are the only group in the community capable of understanding its complicated structure. Statesmen, philosophers, generals, poets, may lead self-supporting communities, but only engineers may lead a great, interlocked economic structure, with a score of exposed live arteries throbbing in every metropolitan area.

In a sense the modern world is not led at all. It simply flounders. In the United States, for instance, we have a political government composed chiefly of office seekers and chair warmers, who have no more idea of the complexities they are supposed to direct than the man in the moon. The real action in the Republic is provided by business men affiliated with large corporate enterprises. A few of them, like Mr. Owen D. Young and Mr. Dwight Morrow, may possess some sense of state, to use the phrase of H. G. Wells, but the majority neither know nor care where the body politic is headed.

The pursuits of profit is a stimulating adventure but an intensely narrow one. Rare is the business man who can look over the top of his own balance sheet; rare even the man who can plan for a balance sheet three years in advance. So far as the Republic moves, however, the man of business provides the driving force, leaving the statesman, the philosopher, the professor, the editor, the general, the parson, to contemplate gloomily the crowns which once they wore.

At the heel of the business man follows the engineer. The former says: Let there be light, and the latter provides it . . . Let there be a thousand oil wells (in a pool where wasteless exploitation requires but a hundred) and they are obediently drilled . . . Let there be the highest building in the world (to choke an already throttled Grand Central station) and it is built . . . Let there be an almost untra-violet lamp (to sell to the millions who believe in advertising) and, brave in nickel and aluminum, it is promptly constructed . . .

The engineer has built the modern world, but only at the bidding of his master's voice. The master knows not a crank shaft from a piston rod, but he knows what will sell, and is quick to see the profitable possibilities of every advance in pure science. The world is not planned by the business man, for he has no plan. It is not planned by the engineer, for hitherto that has not been his function. He has constructed endless detail, but the whole, whether it be the nation, an economic region, a city, a railway system, a coal basin, a single industry, a straight line marketing system, has never been relegated to his charge. Technicians are building in suburban New York a little town, ultimately to house 25,000 people, designed specifically for the motor age. So far as I know, this is the biggest single project involving a social-economic goal ever permitted to the engineering mind in the United States. (In Russia today, the engineering mind has the disposal of some thirty-three billions of dollars for new construction during the next five years.) It will be the most convenient, comfortable, safe, and perhaps the most sightly suburban town to live in that the nation has known. The business man has stepped aside, taking a modest six per cent—to let the engineer run the show.

It is my conviction that the engineer can run far bigger shows than the town of Radburn to the satisfaction of (1) the people who are to use them or work in them, (2) the investor, (3) himself, (4) the technical requirements of the country's future development. Suppose, for instance, that broad-visioned engineers had had the past century in charge as directors—or co-directors if you will. Would they have permitted:

The depletion of our forest at a rate four times that of the annual growth?

The exhaustion and erosion of soils, and the floods which follow after?

The violation of all the laws of geology in the exploitation of petroleum pools?

(Continued on Page 16)

WHAT IS ENGINEERING?

The Views of an Electrical Engineer

Mr. R. E. Hellmund, Chief Electrical Engineer of the Westinghouse Electric and Manufacturing Company of East Pittsburgh, Pa., has written a most interesting pamphlet entitled "What is Engineering?" Lack of space prevents complete reproduction of a very worth while article. Of particular interest are his definition of engineering and his reflections upon the requirements and the training of engineers.

"What is engineering and how is it carried on?

"In answering this question, it is intended to give the engineering student and the younger engineer a broader conception of their life work than they usually obtain during the early period of their activities. The necessity of crowding into the few years of school life a great amount of fundamental knowledge together with certain specific information may have a tendency to obscure in the student's mind the real character of the highest type of engineering.

"In offering a definition of engineering, I usually prefer something of the following order: 'Engineering is an activity other than purely manual and physical work which brings about the utilization of the materials and laws of nature for the good of humanity.' This, of course, is a rather broad conception and includes a great part of all human endeavor. On the one hand, it distinguishes engineering from the purely physical and manual tasks performed by various tradesmen and factory hands in merely carrying out an art previously conceived and developed, while on the other hand it includes whatever mental activities were involved in the conception of even the simplest implements used in human life and ways and means of constructing them. For example, the human being who conceived the idea of a wagon with rolling wheels was in his time as outstanding an engineer as the one who nowadays works out the intricate mechanism for talking movies or the like. Even today, some of the highest grade of engineering is employed in finding ways and means for producing some of the simplest implements at a minimum cost so as to make them available to the greatest number possible.

"The definition given above distinguishes between engineering and pure science or research. These latter activities are frequently undertaken primarily to increase human knowledge, but with no direct purpose of deriving material benefits from such knowledge. It is true that very little additional knowledge has ever been acquired which did not prove to be useful to humanity at some time or other; nevertheless, an engineering activity is distinct from a scientific activity in that it is always started with the direct idea of producing something that is useful for some purpose or other in human life. It is this fundamental thought which the engineer should always keep uppermost in his mind when carrying on his work. When in his daily work he finds it necessary to use some intricate mathematics, he should realize that this in itself is not a purpose, but merely one phase in the work of producing something of use. In constructing anything, the engineer should continuously keep before him its ultimate use and application and not waste his thought and effort on details and operations which at the time prove very interesting and absorbing but which do not contribute to the final accomplishment. In these remarks it is not intended to detract from the desirability of carrying on scientific work, nor to imply that an engineer should never undertake scientific work, but merely to point out to him that in the carrying on of his engineering work, the utility of the result produced should be the very keynote of all his activities.

"The following more detailed discussion will by necessity touch upon many topics, and may therefore leave the student under the impression that engineering is a rather complicated activity which he may find difficult to master. It is true that engineering is a rather varied activity, a feature which makes it so interesting, but the majority of the individual tasks are rather simple. Furthermore, the young engineer is usually not called upon to assume the broader responsibilities of the work until he has acquired a certain amount of experience."

Knowledge—The Tool For Engineering

(1) Fundamentals

"Our definition states that engineering is the application of the laws of nature to useful purposes. It is at once evident that the successful engineer must be familiar with such laws. To be more specific, the engineer should be very familiar with physics, which deals with the laws of nature. Many engineers have to specialize, and in their work may not need all subjects covered by physics, but it is surprising how many different phases of it frequently enter into the design of even the simplest devices. Therefore, too much emphasis can hardly be laid upon the study of physics.

"Our definition further refers to materials and the activity of putting them to use. This in turn necessitates a knowledge of materials and of ways and means of changing them from one form to another; in other words, it emphasizes the need of

(Continued on Page 17)

OBSERVATIONS OF LAYMAN

Indispensable Importance of the Engineer and Architect

The following comments from the pen of Fred D. Van Amburgh, Editor and Manager of the publication known as the Silent Partner are a splendid tribute to the professions of Architecture and Engineering:

"If those mighty lips of the Sphinx at the base of the Egyptian Pyramids could speak, they would probably utter these words: 'Before Abraham was, I am.'

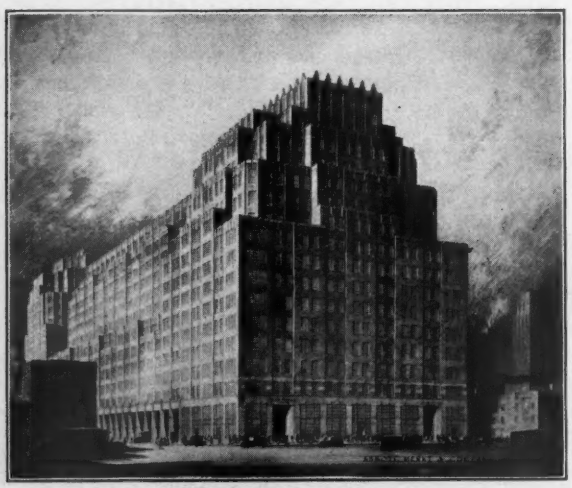
"There that relic of Egyptian antiquity stands in shifting drifts of sand, solemn and silent, surrounded by that awful desert, the symbol of endless eternity.

"Horribly mutilated by the elements of countless centuries, that Sphinx, carved from a natural cliff over six thousand years ago, was, without doubt, the mental inspiration for the ancient Engineers and Architects who built the stupendous, awe-inspiring Pyramids, the most impressive achievement in human workmanship.

"Race after race have followed the same inescapable cycle of Time, culminating in decay and death, all leaving their irresistible attractions of undying fame and achievement.

"As world travelers gaze on such a stupendous solid mass of masonry,—and all with such accuracies that astronomical calculations have been based on its shadows and angles,—they more fully realize the ages-old, indispensable importance of the Engineer and Architect.

"Sixty thousand captives placed the Pillars of the great Roman Collosseum, and for centuries it was thought that great giants handled the huge blocks of stone fastened together with cement, but it was the marvelous skill and experience of the ancient Engineers and Architects who planned every detail of that great amphitheatre now known as the 'King of Ruins.'



UNION INLAND TERMINAL No. 1

"That edifice, even in ruins, eclipses the grandeur of everything else in Rome, and all built without the possibilities of panic, fire or collapse, for to trifle with public lives in those days meant the Engineer and Architect was speculating with his own life.

"Once an Architect named Attitius designed a great wooden structure which collapsed, causing the loss of hundreds of lives, and after that catastrophe, Tactitus tells of the Engineer and Architect's punishment in three short words: 'Attitius was burned.'

"Again we see the ancient and accepted importance of the wonderful work of the Engineer and Architect, a pioneer profession, and many consider that it was the first and foremost profession, for then, like now, it is building, building, building.

"The awe-inspiring temples of the ancients are at present the most amazing ruins which the sun beholds in all its course. In fact, the work of the ancient Engineers and Architects often seems to surpass what we think was probable or even possible.

"How true it is that down through the vestibule of all Time—thousands of years before Christ,—down to the remaining remnants of the Pillars of Rome, where once echoed the voice of Caesar, at a time when savages were scalping white folks on the site of Paris, and when Britain was an almost unknown land of Barbarism, down to this practical period of our magnificent buildings and towering skyscrapers, the Engineers and Architects who have dreamed the great dreams, always have been, and always will be, first and foremost in progress.

"In the past and in the present all overwhelming works of grandeur and usefulness, and all permanent performances in the art of building, have come into being after the plans of the Engineers and Architects.

"The Engineers and Architects are always outstanding, for they are the advance guard of any and all construction, and at last, they are the authority who place the seal of approval and acceptance on the final construction.

"Recently I accompanied Mr. Merkt, of Abbott, Merkt & Company, Engineers & Architects, through the rows of the ruins of old walls in that mighty-mouthed, gigantic pit—in that relatively wide and deep, whole city-block cavity, where will soon rise one of the wonders of this age, to be called, 'Union Inland Terminal No. 1.'

"It will be the largest building in New York City,

(Continued on Page 18)

RECIPROCITY

As One Architect Views the Situation

The following address, delivered to the graduating class of 1931 at Rensselaer Polytechnic Institute by Chas. Butler, F. A. I. A., practicing architect, of 56 West 45th Street, New York, merits wide distribution among both architects and engineers:

Mr. President, Members of the Board of Trustees, Members of the Graduating Class, Ladies and Gentlemen:

Let me first express my deep appreciation of the great distinction which has just been conferred upon me. For an architect to be given an honorary degree by a School of Engineering is high honor indeed and far beyond my individual merit. Let me then take it as an honor conferred on my profession and as an earnest of the relations of friendship and cooperation which we are resolved to establish always more firmly between our professions.

I appreciate also the opportunity which you have given me to address this gathering of all the branches of the engineering profession and the allied schools which compose the Rensselaer Polytechnic Institute.

I have had very little connection with Rensselaer Polytechnic Institute, but what association I have had with it you will, I think, admit was of the best for I had the privilege of knowing well Henry Hodge, one of your ablest graduates, and he epitomizes to me the R. P. I. Do you wonder that I have always had a high respect for the Institute?

I wrote President Ricketts some weeks ago that I thought I would speak to you today about the relations of engineers and architects, and he replied that he thought my subject was well chosen, but he feared that if enough engineers and architects and brickbats were coincidentally available, my remarks might be abruptly terminated; nevertheless, I shall speak to you of the relations between architects and engineers. Let me say first that in my judgment the establishment of your School of Architecture will prove to be one of the most valuable forward steps ever taken at this institution, from the point of view of both engineers and architects. Our two professions of necessity complete each other—We cannot create architecture without engineering, and heaven knows, you ought not to practice engineering without art.

One of the chief causes of failure in understanding between us arises from the fact that from the start of our studies in preparation for the practice of our professions we are usually segregated from each other. We think of an engineer as a man who spends his time playing with a slide rule and you think of an architect as a poseur, who wears long hair and makes pretty pictures and does not know how to make a building stand up without an engineer to help him. That we are each of us wide of the mark in our judgment of the other does not prevent our starting out in life with settled prejudices which have been broken down by years of experience. The fact that here engineers and architects will be trained side by side, in many cases following the same courses and passing the same examinations should tend to promote understanding and mutual appreciation, on the one condition that neither group should consider itself superior, but that each should rather try to comprehend the special point of view of the other. I know that it will be invaluable for the architects to be thrown with engineers, and I feel sure that the engineers on their side will derive no little benefit from the association.

Now just to corrct an impression in regard to the architects' training, let me say that I am a graduate of the Ecole des Beaux-Arts in Paris, than which I am sure in your minds no place is more characterized by flowing ties and flowing beards and generally loosely flowing artistic ideas; and yet in that school of architecture, famous for its artistic teaching, we spent a full half of our second year on wood and stone construction, and the entire third year on general construction, including steel framing, although I have to admit that in my case it was so long ago that skeleton construction had not yet appeared on the scene. Just now we are taking stock of our own architectural training, and I had occasion to talk recently with one of the two men who have visited some fifty of our schools throughout the country. He told me that in his judgment and that of his colleague the art of construction was in general being better taught in the architectural schools than the art of design. As a mater of fact the day of the long-haired "artist architect" is long since over, and while an architect must be first of all an artist he must have a very wide practical knowledge of materials and methods of construction, and above all he must have a knowledge of the art of planning. You must remember that in architecture the fundamental requirement is not the exterior of the building but the plan, and this plan must be based on requirements which are eminently practical. To refer once more to the Ecole des Beaux-Arts, as you perhaps know, the culmination of the work of the French students lies in the competition for the Prix de Rome which gives the winner four years free residence and study at Rome.

By the way, it will interest you at Rensselaer, where there have always been many foreign stu-

dents, to know that the Ecole des Beaux-Arts receives foreigners on the same footing as Frenchmen and gives them free training, even though they pay no taxes and do no military service for France.

This Prix de Rome test is the one great school competition limited to Frenchmen, to which every French student looks forward, and for which the ten final competitors are chosen by progressive elimination through sketch compositions. The final twenty-four hour test is entirely devoted to the solution of a great problem of planning, and the elevations are presented at so small a scale as to be negligible, merely diagrams to elucidate the general scheme of plan.

This, gentlemen, in the school which of all others is regarded, and rightly, as the fountain-head of artistic design in architecture.

I remember my old professor in Paris saying to me one day, after I had spent some years at the school—"Butler, you have been here long enough to realize the strength of our teaching and to know that it is based on good planning. You can put forty good elevations on a good plan, but if you haven't got a good plan you never can have a good elevation." He pushed this thing so far, and kept us working so consistently on plan, that often our final competition drawings would be turned in with excellent plans, but with elevations which had hardly progressed beyond the sketch stage.

You have recently heard much criticism by architects and laymen of the proposed Radio City in New York at 50th Street and Fifth Avenue, and much of the criticism of laymen has centered around the stark bareness of the buildings. Let me assure you that such criticism is not based on the fundamental fault of this group of buildings. What we architects criticize and criticize severely is the bad grouping of the buildings and the poor proportions of the individual units. We don't care whether a building is richly decorated or plain as a pikestaff; it is obvious that ornament is appropriate in certain locations and in certain types of buildings, but the simple Empire State and the ornate Woolworth are both magnificent structures.

You need only consult your own curricula to realize that today architects are given a basic training not only in planning and design but also in construction, in heating and ventilating, sanitary and electrical engineering. Nevertheless, the work of the average architect must lie primarily in the planning and design of buildings.

I believe that I could, if given time, make the calculations for the steel of a skeleton construction building, but I am convinced that I should be ill-advised and unfair to my client if I did this work myself and failed to take advantage of the great skill and experience of the engineering profession, both in structural work and in mechanical and electrical engineering.

I read last week in "The Architectural Record" a searching article on architectural schools by Professor Gulley of our new Department. Let me assure you that he is thoroughly conversant with the faults in our existing teaching methods and the necessity of breaking with bad traditions. His attitude gives promise for the building up of a school which will give to its students a thorough grounding in the modern requirements for competent practice of our profession, so that they may in years to come reflect credit on Rensselaer Polytechnic Institute.

So much in regard to the architect and what his training is, or should be in a good school. Now for the engineer.

As soon as we get out in the open and begin the practice of our profession we architects come in contact with engineers and very promptly, if we have any sense, we learn that our preconceived ideas as to them are wide of the mark and though we may not be logical enough to change our ideas of the profession as a whole, we realize that the men with whom we work are almost without exception very different from what we had supposed. The group of engineers who are most called on to work with architects, structural, mechanical, electrical and sanitary engineers, fully realize what the architect is striving for and sympathize with his desire to create a building which will be not only practical but a thing of beauty, and that beauty is inherent in the design of the factory and the power house as well as in the college building and the religious edifice. In other words, these men are men of imagination and they have learned to appreciate the other man's point of view, and to see what he is striving for, and if only all engineers and all architects could be brought together, I should have no fear of lack of understanding between our two great professions.

You here at Troy are near enough to Albany to be familiar with the rather strained relations which have existed for the past two or three years between architects and engineers during the sessions of the legislature. Some of your representatives have resented the stiffening of requirements incorporated in our registration law and the stipulation that none but registered architects might design and superintend the erection of buildings. Our architects' state registration board has tried to remedy this in part by registering a number of engineers as architects, but that was only a partial solution to what many of us thought was a too strict requirement of the law. The engineers retaliated by pushing legislation which would give to any and all licensed engineers the right to practice architecture and we came back with the argument that many types of engineer were not competent in that line. Then last winter a national joint committee of prominent engineers and architects studied the question and recommended that structural engineers be permitted to practice architecture, and this report was signed by the civil

and mechanical engineer members and by the architects, but the electrical engineer member refused to sign, because he felt that this would be the first step toward the segregation of the profession of engineering into many different groups, and recently the Board of Directors of the Civils disapproved the report for the same reason.

Meanwhile, out of all this turmoil a new thought has been advanced; what do we architects care where or how an engineer has acquired his training if he knows how to do the job? If an electrical or a chemical engineer knows how, he should receive the same treatment as his structural engineer brother. We feel however that to practice architecture the engineer should have some knowledge of the art of planning, of which I have spoken. You will realize that in order to plan a theatre or an office building a man must know more than how to make a building stand up and resist wind pressure; he must be familiar with convenience planning of corridors, spacing of windows, width of aisles, sight lines, and with the planning of exits for safety of life, but if he can qualify in these particulars and in structural matters I personally, and in this I am not alone, believe that he must be permitted to do what an architect does, and I trust that this may be authorized by legislation here and throughout the nation.

Of course I feel that the exterior design of a building is of very great importance, but the laws governing the practice of architecture are based on the protection of life, health and property, and although I should like to see it admitted, we have not yet reached the point where ugliness has been defined by law as a menace to health and property. We shall have to rely on the development of imagination among you engineers; the realization that an ugly building really hurts those who look at it, to achieve this result. With better understanding between our professions I have no doubt of the future.

I have studied with interest the book of photographs of work done by graduates of the Institute —among the outstanding achievements are many bridges and of these some are remarkable by their beauty of form. The men who designed them were certainly not lacking in artistic sensibility.

A superb demonstration of art in engineering is the Hudson River Bridge now nearing completion in New York City. It is hard to conceive of anything more beautiful than this majestic structure in its present stark simplicity, and I personally trust that it will never be clothed in masonry.

You may object that it is a counsel of perfection to ask architecture to have knowledge of engineering and engineers to be not ignorant of architecture, yet we have the historical example of one of the world's greatest men, Leonardo da Vinci, who in the 16th century was not only a very great painter, but was withal a great engineer and a great architect, with no mean ability as a writer. That he was not merely the exception which proved the rule is shown by what we know of Michael Angelo, Brunelleschi, and Sir Christopher Wren, all great architects and great engineers.

All of this is probably very boring to the great majority of you who do not expect to have to deal with our profession, but there is a moral to it which you can all apply to yourselves.

I spoke of the fact that Henry Hodge to me epitomized the R. P. I. He was a great man and a great engineer, busy on great engineering projects and yet when he came into our office to help us on small jobs, he had the same interest in and understanding of our problems that he had for the large problems; in other words, he had that great gift of imagination and the ability to put himself in the place of the other man and realize his point of view.

I read the other day in Benson's book on the Victorian era that Queen Victoria was strong on common sense but had no imagination, while the Kaiser had much imagination but no common sense and that, as a result, neither was a complete success, although he considered common sense the more important quality. You engineers are famous for your common sense, so I urge you to cultivate your imagination, while we architects should strive to acquire more of the common sense which some of us surely lack.

I understand that a Commencement address is not complete without a moral, so I leave this with you, and it is equally applicable to those who are called on to deal with architects and those who escape that contact. Cultivate your imagination and try in all your professional life to understand the other man's point of view. Even at my age I have learned a great deal in my recent dealings with your profession and you as young men can learn even more from meeting those with whom you have to deal with an open mind, with imagination, and with understanding.

Thank you.

Editorial Comment:

This is a splendid evidence of fairness and sincerity. However, the author, despite apparent understanding of the problem, makes the assumption, perhaps unintentionally, that engineers seek to practice architecture. They do not. The engineer maintains that designing structural members or installing mechanical, sanitary, electrical or chemical equipment is engineering whether the structure be a bridge or a building. He does not seek to qualify as an artist. He seeks the right to file the plans he prepares which comprise most of those required by departments concerned with life, health and property. Such matters as structural steel, concrete, masonry, mechanical apparatus, electrical equipment, plumbing, ventilation, etc., are the provinces of engineers rather than of architects. The Empire State Building is 95% engineering. All the engineer asks is the right of

(Continued on Page 19)

NEWS ITEMS

(From here and There)

Dr. CALVIN W. RICE

Calvin W. Rice, Secretary or the American Society of Mechanical Engineers, was recently honored by the engineering profession in Germany. He was the recipient of an honorary award at the seventy-fifth anniversary meeting of the Verein deutscher Ingenieure.

The citation reads as follows:

"At the annual meeting in Cologne, commemorating its 75th Anniversary, the Verein deutscher Ingenieure has awarded to Calvin W. Rice, honorary doctor of engineering, its V. D. I. Medal, in grateful appreciation of his services to technical-scientific achievement, particularly in promoting the mutual international interests of the engineers of the entire world."

Congratulations Dr. Rice.

The President of the American Society of Mechanical Engineers sounds a timely note in the A. S. M. E. News of August 7th. He urges that A. S. M. E. humanize its meetings. One might suggest that an attendance magnet would be a lively interest in the licensing question.

* * *

REGISTRATION

KANSAS STATE REGISTRATION and Examining Board of Professional Engineers has been formed with R. A. Seaton, of Manhattan, as chairman; A. M. Meyers, Kansas City, vice-chairman; R. J. Paulette, Salina, secretary; G. C. Shaad, Lawrence, and Blair Boyle, Winfield, members. Applications for registration will be sent out at an early date.

* * *

ENGINEERING SOCIETY LIBRARY

A few interesting facts concerning the Engineering Societies Library at 29 West 39th Street, New York.

It is under the direction of Harrison W. Craver.

It contains 150,000 volumes.

It is the largest engineering library in America.

Its services are available to engineers throughout the world.

Translations of technical works and articles into many languages can be furnished.

During 1930 inquiries and requests by letter, cable, wire, telephone and air mail from every part of the globe were responded to and more than 46,000 photo prints furnished.

Engineers are invited to avail themselves of its facilities.

A. I. E. E. COMMITTEE APPOINTMENTS

At the August meeting of the Board of Directors of the American Institute of Electrical Engineers, President Skinner announced the committee appointments for the administrative year beginning August 1, 1931. One notes with satisfaction the recognition of the services rendered by Mr. H. A. Kidder, a Vice-President of the New York State Society, who continues as chairman of the committee affecting the engineering profession. The chairmen of the various committees are as follows:

General Committees

Board of Examiners: H. Goodwin, Jr., Consulting Engineer, Philadelphia, Pa.

Finance: C. E. Stephens, Vice-President and Northeastern District Manager, Westinghouse Electric & Mfg. Co., New York, N. Y.

Publication: E. B. Meyer, Vice-President, United Engineers & Constructors, Inc., Newark, N. J.

Meetings and Papers: W. H. Harrison, Plant Engineer, American Telephone & Telegraph Co., New York, N. Y.

Sections: Everett S. Lee, General Engineering Laboratory, General Electric Co., Schenectady, N. Y.

Membership: R. L. Kirk, Asst. to Vice-President, Duquesne Light Co., Pittsburgh, Pa.

Law: W. S. Gorsuch, Engineer of Economics, Interborough Rapid Transit Co., New York, N. Y.

Coordination of Institute Activities: H. P. Charlesworth, Vice-President, Bell Telephone Laboratories, New York, N. Y.

Student Branches: W. H. Timbie, Professor of Electrical Engineering & Industrial Practise, Massachusetts Institute of Technology, Cambridge, Mass.

Headquarters: R. H. Tapscott, Electrical Engineer, New York Edison Co., New York, N. Y.

Public Policy: B. Gherardi, Vice-President & Chief Engineer, American Telephone & Telegraph Co., New York, N. Y.

Standards: A. M. MacCutcheon, Engineering Vice-President, Reliance Electric & Engineering Co., Cleveland, Ohio.

Edison Medal: D. C. Jackson, Head, Department of Electrical Engineering, Massachusetts Institute of Technology, Cambridge, Mass.

Lamme Medal: C. C. Chesney, Honorary Vice-President, Pittsfield Works, General Electric Co., Pittsfield, Mass.

Code of Principles of Professional Conduct: R. F. Schuchardt, Chief Electrical Engineer, Commonwealth Edison Co., Chicago, Ill.

Award of Institute Prizes: W. H. Harrison, Plant Engineer, American Telephone & Telegraph Co., New York, N. Y.

Safety Codes: J. C. Forsyth, Supervising Engineer, New York Board of Fire Underwriters, New York, N. Y.

Columbia University Scholarships: W. I. Slichter, Professor of Electrical Engineering, Columbia University, New York, N. Y.

Legislation Affecting the Engineering Profession: H. A. Kidder, Supt. of Motive Power, Interborough Rapid Transit Co., New York, N. Y.

Economic Status of the Engineer: C. O. Bickelhaupt, Asst. Vice-President, American Telephone & Telegraph Co., New York, N. Y.

Advisory Committee to the Museum of Science and Industry in the City of New York: John Price Jackson, Manager, Dept. of Personnel & Statistics, Manhattan District, New York Edison Co., New York, N. Y.

Technical Committees

Automatic Stations: D. W. Taylor, Asst. Electrical Engineer, Newark Branch, United Engineers & Constructors, Inc., Newark, N. J.

Communication: H. S. Osborne, Transmission Engineer, American Telephone & Telegraph Co., New York, N. Y.

Education: R. E. Doherty, Professor of Electrical Engineering, Yale University, New Haven, Conn.

Electrical Machinery: P. L. Alger, Engineering General, General Electric Co., Schenectady, N. Y.

Electric Welding: P. P. Alexander, Research Engineer, Thomson Research Laboratory, General Electric Co., Lynn, Mass.

Electrophysics: V. Bush, Professor of Elec. Power Transmission, Massachusetts Institute of Technology, Cambridge, Mass.

General Power Applications: C. W. Drake, General Engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Instruments and Measurements: E. J. Rutan, Supt., Test Dept., New York Edison Co., New York, N. Y.

Applications to Iron and Steel Production: A. C. Cummins, Electrical Engineer, Carnegie Steel Co., Duquesne, Pa.

Production and Application of Light: W. T. Blackwell, General Lighting Representative, Public Service Elec. & Gas Co., Newark, N. J.

Applications to Marine Work: R. A. Beekman, Engineer, Federal & Marine Dept., General Electric Co., Schenectady, N. Y.

Applications to Mining Work: D. E. Renshaw, Mining Section Engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Power Generation: J. R. Baker, Operating Engineer, Pennsylvania Water & Power Co., Baltimore, Md.

Power Transmission and Distribution: P. H. Chase, Chief Engineer, Philadelphia Electric Co., Philadelphia, Pa.

Protective Devices: Raymond Bailey, Asst. Electrical Engineer, Philadelphia Electric Co., Philadelphia, Pa.

Research: L. W. Chubb, Director of Westinghouse Research Laboratories, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Transportation: E. L. Moreland, Consulting Engineer, Partner, Jackson & Moreland, Boston, Mass.

At the same meeting of the Board of Directors, new members were added to the Edison Medal Committee as follows: J. E. Kearns, Chicago, Ill.; F. W. Peek, Jr., Pittsfield, Mass.; L. T. Robinson, Schenectady, N. Y.; C. E. Stephens, New York, N. Y.; Percy H. Thomas, New York, N. Y.

The following new members were added to the Lamme Medal Committee: B. A. Behrend, Wellesley Hills, Mass.; A. M. Dudley, East Pittsburgh, Pa.; J. C. Parker, Brooklyn, N. Y.

From:

F. L. HUTCHINSON,
National Secretary, A. I. E. E.

* * *

THE TRISECTION OF AN ANGLE

The statement by the Editor, appearing in the July issue of THE AMERICAN ENGINEER, to the effect that the trisection of an angle, by means of compass and straight edge, was as yet an unsolved problem inherited from the ancient Greeks, has resulted in the forwarding of numerous copies of newspaper accounts of the announcement that a solution has been developed by the President of Duquesne University, the Very Rev. J. J. Callahan, a Catholic priest.

If it be true all honor and recognition to the good father for his contribution to science. However, similar announcements have often been made during the past 2500 years. One must reserve judgment until proof has been submitted.

CHAPTER NEWS

The New York State Society welcomes another Chapter comprehending St. Lawrence, Clinton and Franklin Counties.

The following Officers and Directors have been chosen:

President, A. E. Barlett; Vice-President, Harold R. Horton; Secretary and Treasurer, Charles B. Schermerhorn; Directors: Earl J. Mattis, Philip J. Baron, Charles H. Lord, Charles W. Golder.

The application bore the signatures of 18 Charter member petitioners.

Congratulations and best wishes to the latest addition to the family.

To Fred H. Zurmuhlen, Chairman of the Membership Committee, the Society expresses its appreciation.

COMPETITION ON A FEE BASIS

A special meeting of the executive board of the Bronx Chapter was called on July 17th, to consider a report of the Professional Conduct Committee of the Chapter relative to alleged breaches, by some members of the Chapter, of the Schedule of Minimum Charges for Surveys adopted by the Chapter on May 8th, 1930.

The committee recommended: that the attention of all members be focused upon the schedule by mailing to each a copy of such schedule together with a letter urging compliance with it; that the Bronx Council of the Association of Engineers of New York (an organization composed almost entirely of engineering employees of the City of New York) be similarly advised and invited to cooperate by securing observance of the schedule by its members; that publicity be given to articles urging upon purchasers of surveying services the desirability of procuring such services at not less than schedule fees. The recommendations were adopted unanimously and are being put into effect.

This matter is of peculiar interest considered in the light of the purposes for which the New York State Society was formed. These purposes are two (2); first, to safeguard the public welfare by aiding in the enactment and enforcement of laws restricting professional practice in engineering and land surveying to properly qualified persons; second, to promote the interests of the profession by educating the public to a fuller appreciation of the dependence of modern civilization upon the engineer and to more equitable evaluations of his services.

The actions of the Bronx County Chapter in adopting this schedule, and in its present endeavor to secure unanimous observance of it within the county, aim to effect the accomplishment the second of these purposes. It is educational as it apprises the public, the purchasers of surveying services, and members of the profession, of what, in the opinion of a large body of fair-minded men of competent judgment, should be proper minimum remuneration for surveying services performed in accordance with accepted standards for such work as recognized by reputable practitioners in the profession.

The adoption, maintenance and observance of schedules of fees for engineering and surveying services will go far toward eradicating the evil of competition on a fee basis. This practice in the field of public work is evidenced by advertisements of governmental agencies for bids for engineering and surveying services; in private practice, where schedules have not been established, it is general. It is reprehensible practice and has been proscribed by the Code of Ethics of this society; it is prejudicial to the public interest as it fosters the continuance in the profession of persons incompetent to secure commissions on the basis of quality of service; it is detrimental to the best interests of the profession as it tends to force fees down below the level of a fair return for service and to lower the standard of service. Awards of commissions or contracts for professional services should be made to those whose competence, accomplishments and character are guarantees of successful performance.

The endeavor of the Bronx County Chapter is worthy of success. And it is also worthy of emulation by the other Chapters of the State. The Chapters constituting a chain of power houses of professional thought and influence throughout the State would by the establishment of such schedules materially advance the economic welfare of members in private practice.

RAPHAEL J. SMYTH,
Chairman, Committee on Chapter Activities.

* * *

THE PHILOSOPHER–ENGINEER

(Continued from Page 8)

The present criss-cross and duplication in the transportation system?

The neglect of cheaper waterways for the profitable exploitation of high cost railways?

The jams, bottle necks and traffic tangles of metropolitan districts?

The building of skyscrapers faster than the means to empty and fill them?

The elephantiasis of New York City at the expense of other ports?

The cross-hauling of raw metals to Connecticut and finished brass back to the West again?

Or, if you please, the desecration (to say nothing of the added accident rate) of every highway in the country with millions of square feet of cigarette, cosmetic, and soap appeals?

That a century of the engineering mind controlling economic forces would have made a wasteless world is, of course, problematical. The rate of obsolescence in the technical arts is so great that nothing can be planned with finality. Mistakes would have been made; loss and leakage taken their toll. But I am inclined to believe that a good half of the man-power which now runs to waste might have been salvaged, with the result that poverty would have been quite finally abolished, unemployment enormously diminished, the accident rate drastically reduced, and a cleaner, safer, more comfortable, more sightly, more integrated nation have been our heritage.

I speak of the *engineering mind.* This is not to be confused, alas, with the average engineer as we know him. Before he was yoked to the treadmill, there were moments when he glimpsed the dignity, the responsibility, the supreme challenge of his profession; when for a lucid interval he realized that he belonged to the most important profession in the modern world; that indeed he had the world in his keeping. A few individuals (I will

name no names) have kept the realization untarnished; that is what I mean by the engineering mind.

It is a mind that is professional, not commercial; dedicated to building, not to profit-making; that is done with false modesty and has the courage to accept the job of taming the billion wild horses which Watt let loose; that thinks straight and hard; hates waste and confusion, dirt and despair; that never stoops to the shoddy or the adulterated.

Plato once called for philosopher kings. Today the greatest need in all the bewildered world is for philosopher engineers.

Engineers have, at times attempted to prove their necessity and worth and to extol themselves, but no engineer has as yet painted such a vivid picture for public contemplation. Stripped of apologies, extenuations and divigations the argument is most convincing; even though the statement that a nondescript crew of men would, if today shipwrecked on an uninhabited but fertile island, die within two months is a bit far fetched.

One thing the war demonstrated (and to those who were in it the only thing) was that men could adapt themselves to circumstances.

The above chapter is sufficient to indicate the theme of the book which will appeal to every engineer and which should be read by every citizen, particularly those who profess to be students of political economy.

Reprinted with approval of:
The Macmillan Company,
The Technology Review.

OFFER TO MEMBERS AND SUBSCRIBERS

A 25% DISCOUNT from the purchase price of the Nemesis of American Business will be allowed to all members of the Society and subscribers to The American Engineer. Those who wish to avail themselves of this offer kindly fill out order blank on page 20 and forward same together with a check or money order of $1.50 against regular price of $2.00, to the office of The American Engineer, Grand Central Terminal Building, New York City.

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WHAT IS ENGINEERING

(Continued from Page 9)

chemistry in engineering work. Chemistry is sometimes distasteful to the engineer, but he should realize that a good deal of it is essential in his daily work, and have at least enough to enable him to keep out of trouble or to discuss his problems intelligently with specialists. Metallurgy, one particular phase of chemistry, is of outstanding importance to the engineer.

"Mathematics is a very essential tool both in the study of the laws and materials of nature and in solving the more specific problems met with in engineering. The more mathematics an engineer has, the better he is equipped to undertake certain phases of his work.

"Aside from the previously mentioned broader fundamentals, students contemplating a particular line of engineering must manifestly lay special stress upon certain studies which will prove especially useful in their contemplated work. Thus, the electrical engineer needs a good deal of direct —and alternating—current theory, while the mechanical engineer needs mechanics. It must be realized, however, that although an electrical machine has to be designed according to certain electrical laws, all of its component parts are of a mechanical nature, which means that the electrical engineer usually has to employ mechanics to at least as great an extent as he does his electrical theory. On the other hand, there is nowadays hardly any mechanical machinery which is not either driven by electrical machinery or the control of which is not tied up with electrical phenomena, and therefore the mechanical engineer who slights his electrical theory is considerably handicapped.

"The study of economics and accounting also will prove valuable to the engineer, as there are very few activities which he can carry on without being continually confronted by economic and accounting problems.

"The importance of the fundamentals mentioned can hardly be over-emphasized, and it is therefore quite right that the schools are endeavoring more and more to equip the students with a knowledge of these fundamentals in preference to specialized subjects. Engineers should, however, recognize the fact that, inasmuch as the schools cannot possibly cover the ground adequately in a four years' course, it will be necessary to carry on certain studies right along if they wish to make real progress in their profession. Such subjects as mathematics, vector analysis, and the like, which require familiarity with various conceptions and working methods, will never prove of value unless they are more or less continuously used. Furthermore, students should not be discouraged by the fact that during their college course they did not understand everything fully, because such subjects are not altogether a question of understanding,

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but rather one of familiarity. Mathematics in particular is a subject to be mastered by continuous practice, and its mastery is really nothing but a matter of getting used to it and to the various principles, manipulations, and conventions entering into it. It might be compared to a tool which is not of much use unless brought out and sharpened from time to time and to keep in good operating condition.

(2) Specific Engineering Knowledge

"The schools, having a difficult task in covering the necessary fundamental knowledge in the short time available, are still less able to include in their curricula a great number of specific engineering subjects. This does not mean, however, that an engineer can hope to carry on any particular line of engineering successfully without a good deal of specific knowledge relating thereto, but rather that he has to acquire most of such knowledge after his college years. Some of the more progressive manufacturing concerns have recognized this fact and are providing ways and means for the obtaining of such specific knowledge."

Editorial Comment:-

The above is instructive and logical. It coincides with views so frequently expressed by some members of this Society.

OBSERVATIONS OF A LAYMAN

(Continued from Page 10)

costing when completed, including land, about $16,000,000.

"This marvelous construction when completed will be the only building in the world designed as a Universal Freight Station, and used cooperatively by all the railroads serving this great Port District.

"And like the Pyramids that succeeded the Sphinx, two more such buildings will follow the construction of that great building in other locations, proof of the practicability of what Governor Roosevelt aptly called: 'A Post-Office for Freight.'

"The idea of cooperatively handling inbound and outbound (less-carload), freight all at one point, and by all rails, is certainly the greatest single advance step in improvement and progress in the history of the Port of New York.

"At present, all freight in New York City is handled at a dozen or more different freight stations located at various points in Manhattan, with each station handling the freight for one railroad alone.

"Today a merchant shipper must send his trucks to each of the railroad freight stations, causing a great loss of time and money, which of course is paid for by the 'ultimate consumer.'

"The plan of a consolidated method for handling less-than-carload freight is not only of tremendous benefit to the people of the Port of New York, but the idea is of incalculable importance and advan-

tage to the people throughout this whole country.

"The upper floors of this great sixteen-story freight station will have vast floor space, much daylight, and will be rented out for general industrial and commercial purposes. The acres of floor space facing Eighth Avenue will be occupied by stores, banks and other business interests. Every floor in the building will be virtually a ground floor, as far as shipping facilities are concerned.

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"By May, 1932, will come the completion of this tremendous freight service station—will come the fulfillment and the full realization of the hopes and plans of years of special study by experts on the staff of the Port Authority, coupled with the cooperation of the Engineers and Architects, Abbott, Merkt & Company, 22 East 40th Street, New York City.

"For about four years the Engineers and Architects have worked on and presented plans for that great project, in conjunction with the staff of the Port Authority.

"They began by studying a site that would be large enough for the needs, strategically located and particularly suitable for decidedly better freight service for all concerned.

"The volume of inbound and outbound freight was surveyed carefully in order to plan a most practical, convenient and economical way to handle all freight, and that necessitated hundreds of sketches, many of which were discarded in favor of better plans.

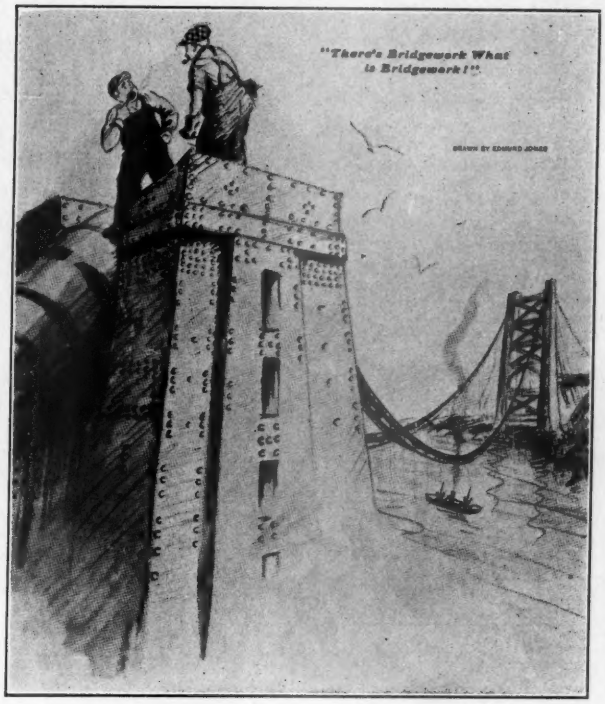
"After an interview with Mr. Hunley Abbott, President of Abbott, Merkt & Company, I was better able to add the real value to this article, which should impress all those who contemplate any construction of a like character. Mr. Abbott warned me to make any statements conservative, but I know that Abbott, Merkt & Company, Engineers and Architects, have long been recognized as among the first and foremost in their profession.

"Like the Engineers and Architects of old, they plan and supervise useful buildings—buildings that will stand the test of Time."

RECIPROCITY

(Continued from Page 13)

every professional man to act as a principal if he be so retained. He does not seek legislation compelling the client to engage him in preference to an architect nor does he seek to practice architecture. Why cannot the engineer retain the architect in the same manner that the architect re-



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tains the engineer, if such be the client's wish? When building departments employ architects to examine and pass upon plans for structures wherein the protection of life, health and property is paramount then such work may be construed as architecture. What the engineer strongly objects to is the practice by architects of signing, filing and holding out the work of engineers as their own. As an example the writer calls particular attention to certain sewer plans which were submitted for his consideration and which while prepared by engineers bore in large bold type the name of a prominent firm of New York architects. No mention was made of the engineer.

The author errs when he states that under the Architects' Law none but architects can legally design and superintend the erection of buildings. There is a saving clause which specifically refers to engineers. The Law Committee of the Board of Regents gave its opinion on the subject in February 1930.

Will some architect demonstrate the logic which contends that only engineers (in building departments and other public offices concerned with life and property) are competent to examine and approve plans that only architects can prepare and file. If engineers examine and pass upon plans, who but engineers should prepare and file such plans. The engineer accepts the proposal so ably set forth by Mr. Butler—Both are honorable professions—allow both to prepare and file plans and trust to each profession not to overstep the bounds and to eliminate incompetents.

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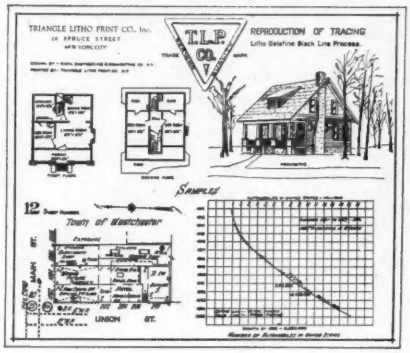

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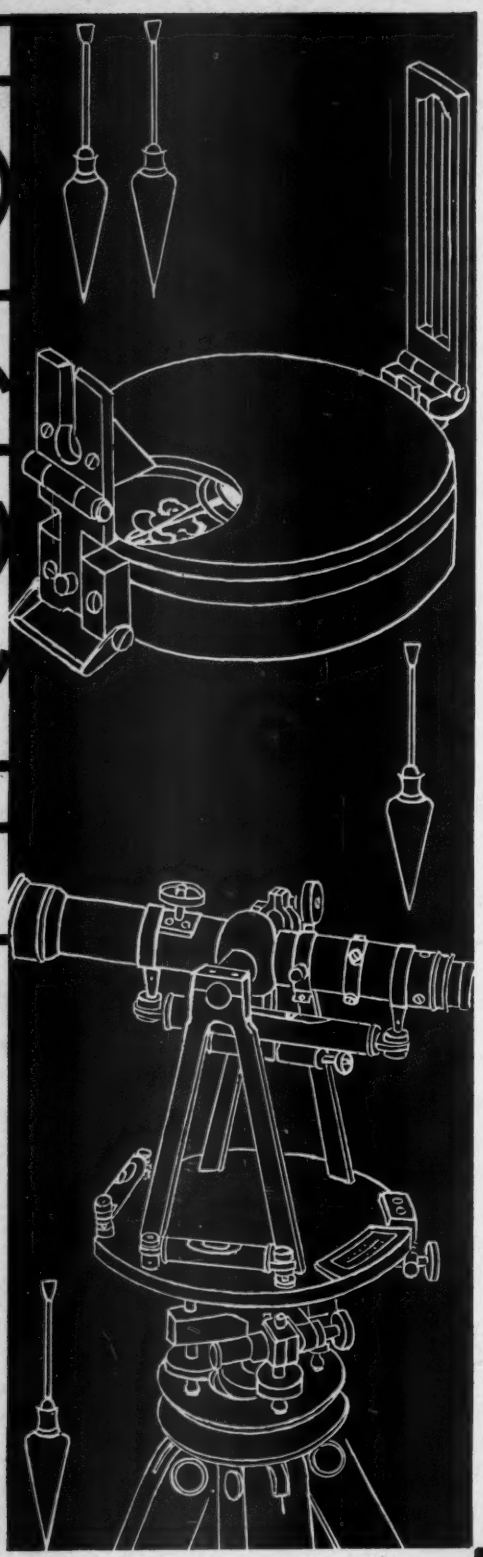

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